

NASA TECH BRIEF



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Novel Circuit Combines Pulse Stretcher With NOR Gate

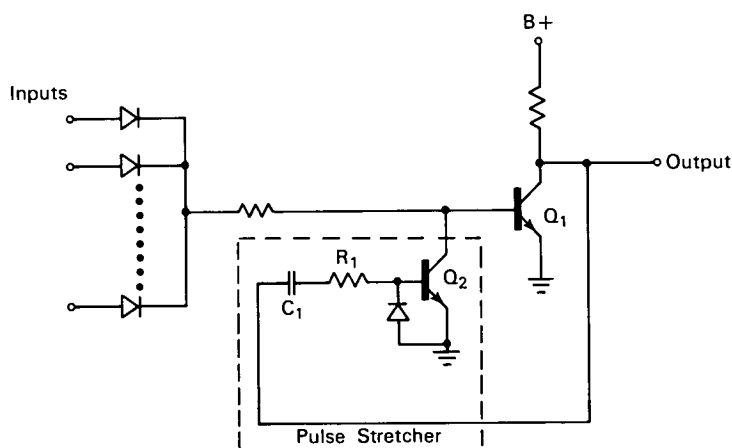


FIGURE 1

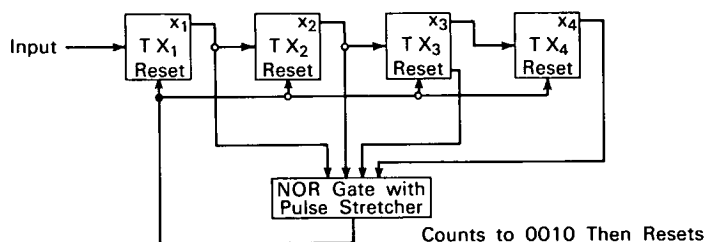


FIGURE 2

The problem: To provide a NOR gate with an output pulse of some predetermined minimum duration. Conventional circuitry has employed an additional NOR gate used with a triggered monostable multivibrator.

The solution: A pulse-stretching circuit combined with a conventional NOR gate.

How it's done: Figure 1 shows a pulse-stretcher circuit added to a conventional NOR gate circuit. With all the inputs at ground potential, the output is positive, current flows through C_1 and R_1 into the base of Q_2 turning it on. Current flows into the base of Q_2 until C_1 is charged (approximately 3 times the $R_1 C_1$ time constant). If the inputs become positive

(continued overleaf)

while Q_2 is still conducting, Q_1 will not be affected since its base is being held at ground potential by Q_2 . When Q_2 stops conducting, the inputs regain control of the output. A diode in series with R_1 provides C_1 with a discharge path to ground. Figure 2 depicts a binary counter using this pulse stretcher-NOR gate for reset. The binary counter must be reset to zero when a certain preselected count has been reached. The NOR gate detects the preselected state and produces a pulse that the pulse stretcher maintains for a period long enough to reset all counter stages.

Notes:

1. The circuit works equally well with PNP transistors, all polarities being reversed.

2. This circuitry has been used successfully in a square-root computer and with digital oscillators.
3. Inquiries concerning this innovation may be directed to:

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Reference: B64-10150

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

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(GSFC-187)